REMARKS

I. Status Summary

Claims 1-3 and 7-19 are pending in the subject U.S. patent application and have been examined.

Claims 1-3 and 7-19 have been rejected on two bases under 35 U.S.C. § 112, first paragraph, upon the contentions set forth on pages 3-16 of the Official Action.

An After Final Amendment B was filed on April 8, 2005. In an Advisory Action dated May 10, 2005 (hereinafter the "Advisory Action"), the United States Patent and Trademark Office (hereinafter the "Patent Office") refused to enter After Final Amendment B. In the Advisory Action, the Patent Office contended that the recitation of "biologically active" in claims 1 and 11 proposed in After Final Amendment B would raise new issues under 35 U.S.C. § 112, first and second paragraphs. The Patent Office further contended that the recitation of "nucleic acids that differ from SEQ ID NO: 1 only by virtue of genetic code redundancy" in proposed claims 11 would raise a new matter issue. Additionally, the Patent Office contended that claims 1-3 and 9-19 would have remained rejected under 35 U.S.C. § 112, first paragraph, because the claims recite percent identity language (enablement) and that the disclosure of one HERG potassium channel (SEQ ID NO: 3), one KCR1 regulator polypeptide (SEQ ID NO: 2), and one MiRP1 polypeptpide (SEQ ID NO: 5) is insufficient written description of an entire genus of functionally equivalent polynucleotides and peptides of at least 90% sequence identity to SEQ ID NOs: 2, 3, and 5.

Claims 4-8 and 20-99 have been canceled without prejudice. Applicants respectfully reserve the right to file one or more continuation and/or divisional applications directed to the subject matter of claims 4-8 and 20-99.

Claims 1, 9-13, and 15-17 have been amended. Support for the amendments can be found throughout the specification as filed, including particularly in the claims as originally filed and in the Sequence Listing. Additional support can be found on page 44, lines 6-19 (biologically active polypeptides of 90% identity) and at page 44, lines 10-16, page 46, lines 3-10, and page 50, lines 19-21 (genetic code redundancy encompassed within the nucleic acids of the presently disclosed subject matter). Thus, no new matter has been added as a result of the amendments to the claims.

New claims 100-104 have been added. Support for the new claims can be found throughout the specification as filed, including particularly in the claims as originally filed. Additional support can be found on page 44, lines 18-22 (99% sequence identity), at page 44, lines 10-16, page 46, lines 3-10, and page 50, lines 19-21 (genetic code redundancy encompassed within the nucleic acids of the presently disclosed subject matter), and in the Sequence Listing. Thus, no new matter has been added by the inclusion of the new claims.

Reconsideration of the application as amended and based on the remarks set forth herein below is respectfully requested.

II. Responses to the Rejections under 35 U.S.C. § 112, First Paragraph

Claims 1-3 and 7-19 have been rejected under 35 U.S.C. § 112, first paragraph, upon the contentions that the specification as filed fails to comply with the enablement and written description requirements set forth therein. The bases for these rejections are presented on pages 3-16 of the Official Action. After careful consideration of these rejections and the Patent Office's bases therefor, applicants respectfully traverse the rejections and submit the following remarks.

II.A. The Enablement Rejection

The Patent Office concedes that the specification enables a method of identifying a compound that increases or decreases the transmission of potassium ions through a HERG potassium channel, comprising: (a) culturing a cell comprising the HERG potassium channel of SEQ ID NO: 3 and a KCR1 polypeptide encoded by the nucleic acid sequence of SEQ ID NO: 1; (b) contacting the cell with a test compound; (c) measuring the transmission of potassium ions through the HERG channel in the presence of the test compound; and (d) comparing the potassium ion transmission through the HERG channel in the presence of the test compound with that in the absence of the test compound. However, the Patent Office asserts that the specification does not fully enable the method recited in claim 1. In particular, the Patent Office asserts that the specification does not teach (a) screening for substances capable of modulating potassium channels other than HERG in conjunction with a human KCR1 polypeptide encoded by SEQ ID NO: 1; or (b) that all potassium channels

are capable of interacting with KCR1. Further, the Patent Office contends that undue experimentation would be necessary to screen all possible potassium channels with all possible compounds for all possible biological activities.

While applicants do not necessarily agree with the Patent Office's contentions regarding the rejected claims, in order to facilitate the prosecution of the instant claims applicants have amended claim 1 to recite a structure comprising a biologically active human ether-a-go-go-related gene (HERG) potassium channel polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 3 and a biologically active potassium channel regulator 1 (KCR1) polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 2.

Turning now to the Patent Office's assertions presented in the Advisory Action, applicants respectfully traverse the assertion that "undue experimentation would be required on the skilled artisan to generate and screen all possible polypeptide variants for activity" (Advisory Action, Continuation of 11). Applicants respectfully submit that the Patent Office has not provided any support for the contention that the experimentation would be "undue", only that it might be complex. However, M.P.E.P. § 2164.01 clearly states that "The fact that experimentation may be complex does not necessarily make it undue, if the art typically engages in such experimentation". Applicants respectfully submit that one of ordinary skill in the art would be capable of generating nucleic acids and polypeptides that are at least 90% identical to SEQ ID NOs: 2, 3 and 5, based on the teachings of the instant disclosure.

Additionally, given the teachings in the instant specification concerning the functional assays for the structure comprising a biologically active human ether-a-go-go-related gene (HERG) potassium channel polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 3 and a biologically active potassium channel regulator 1 (KCR1) polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 2 (*see e.g.*, Examples 1-4 and the Materials and Methods section related to these Examples), applicants respectfully submit that one of ordinary skill in the art would be able to generate and test nucleic acid and polypeptide variants using only routine, and not undue, experimentation.

As a result, applicants respectfully submit that the rejection of claim 1, and the potential rejections of claims 1 and 11 with respect to the phrase "biologically active", under 35 U.S.C. § 112, first paragraph, has been addressed. Furthermore, applicants respectfully submit that claims 2, 3, and 9-19 all depend directly or indirectly, and thus are also believed to be enabled. Claims 7 and 8 have been canceled, and thus the instant rejection is believed to be moot as to these claims. Accordingly, applicants respectfully request that the instant rejection of claims 1-3 and 9-19 be withdrawn, and that the claims be allowed at this time.

II.B. The Written Description Rejection

Claims 1-3 and 7-19 have also been rejected under 35 U.S.C. § 112, first paragraph, upon the contention that the claims contain subject matter that was not described in the specification is such a way as to reasonably convey to one of ordinary skill in the relevant art that the inventors had possession of the claimed invention at the time the application was filed. According to the Patent Office, the specification does not teach any specific potassium channels to be utilized in the disclosed assay other than the HERG potassium channel as set forth in SEQ ID NO: 3.

Applicants respectfully direct the Patent Office's attention to the remarks presented hereinabove with respect to the rejection of these claims under the enablement requirement of § 112. Here again, while applicants do not necessarily agree with the Patent Office's contentions with regard to the instant rejection, in order to facilitate the prosecution of the instant claims applicants have amended claim 1 to recite a structure comprising a biologically active human ether-a-go-go-related gene (HERG) potassium channel polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 3 and a biologically active potassium channel regulator 1 (KCR1) polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 2.

Additionally, applicants respectfully traverse the assertion in the Advisory Action that the phrase "biologically active" is unsupported by the specification as filed and/or is indefinite. With respect to potential rejections under the first paragraph of § 112, applicants respectfully submit that the phrase "biologically active" appears on page 44, line 15, of the specification as filed. Furthermore, applicants respectfully submit that it

would be understood by one of ordinary skill in the art, upon a review of the present disclosure, that in order to practice a method of identifying a compound that modulates potassium transmission by a potassium channel, comprising: (a) providing a structure comprising a human ether-a-go-go-related gene (HERG) potassium channel polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 3 and a potassium channel regulator 1 (KCR1) polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 2, the human ether-a-go-go-related gene (HERG) potassium channel polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 3 and a potassium channel regulator 1 (KCR1) polypeptide comprising an amino acid sequence at least 90% identical to SEQ ID NO: 3 would be biologically active.

Further, applicants respectfully submit that the phrase "biologically active" encompasses that the polypeptides in the assays combine to produce a functional potassium channel. Accordingly, applicants respectfully submit that there is ample support for the phrase "biologically active" in the specification as filed, particularly when read in context of the specification by one of ordinary skill in the art.

The Patent Office also asserts that the specification only discloses one HERG potassium channel (SEQ ID NO: 3), one KCR1 regulator polypeptide (SEQ ID NO: 2), and one MiRP1 polypeptpide (SEQ ID NO: 5), and that this disclosure is insufficient written description of an entire genus of functionally equivalent polynucleotides and peptides of at least 90% sequence identity to SEQ ID NOs: 2, 3, and 5. Applicants respectfully disagree. Other members of the HERG, KCR1, and miRP1 families that have been disclosed in the art. For example, GENBANK® Accession Nos. NP_001003145.1 (dog), NP_038597 (mouse), AAB68612.1 (rabbit), and NP_446401.1 (rat) also relate to HERG channel polypeptides; NP_620801 (rat), XP_534842.2 (dog), XP_589768.2 (cow) and BAE38718.1 (mouse) also relate to KCR1 polypeptides, with the dog and the cow versions being at least 90% identical to SEQ ID NO: 2; and NP_598287.1 (rat), XP_531544 (chimpanzee), AAK15527 (rabbit), and NP_598871 (mouse) corresponds to miRP1 family members. Several of these sequences are at least 90% identical to one of SEQ ID NOs: 2, 3, and 5.

Accordingly, claim 1 is believed to comply with the written description requirement of 35 U.S.C. § 112, first paragraph. Furthermore, applicants respectfully submit that claims 2, 3, and 9-19 all depend directly or indirectly, and thus are also believed to be enabled. Claims 7 and 8 have been canceled, and thus the instant rejection is believed to be moot as to these claims. Thus, applicants respectfully request that the instant rejection of claims 1-3 and 9-19 be withdrawn. Allowance of claims 1-3 and 7-19 is also respectfully requested.

III. Discussion of the New Claims

New claims 100-104 have been added. Support for the new claims can be found throughout the specification as filed, including particularly in the claims as originally filed. Additional support can be found on page 44, lines 18-22 (99% sequence identity), at page 44, lines 10-16, page 46, lines 3-10, and page 50, lines 19-21 (genetic code redundancy encompassed within the nucleic acids of the presently disclosed subject matter), and in the Sequence Listing. Thus, no new matter has been added by the inclusion of the new claims.

Applicants respectfully submit that new claims 100-104 recite *inter alia* the method of claim 1, wherein the percent identity element has been increased to 99%. Applicants respectfully submit that the discussion presented hereinabove with respect to the rejections of claim 1 under 35 U.S.C. § 112 is equally applicable to the new claims.

Additionally, applicants respectfully submit that the Patent Office has conceded that the embodiments wherein the HERG potassium channel polypeptide comprises SEQ ID NO: 3 and the KCR1 polypeptide comprises SEQ ID NO: 2 are enabled. Applicants respectfully submit that these embodiments are recited in claims 101 and 102. Accordingly, applicants respectfully submit that claims 100-104 are in condition for allowance.

CONCLUSIONS

As a result of the amendments to the specification and claims and the remarks presented hereinabove, applicants respectfully submit that claims 1-3, 7-19, and 100-

102 are in condition for allowance. Applicants respectfully solicit a Notice of Allowance to that effect.

If any minor issues should remain outstanding after the Examiner has had an opportunity to study the Amendment and Remarks, it is respectfully requested that the Examiner telephone the undersigned attorney so that all such matters may be resolved and the application placed in condition for allowance without the necessity for another Action and/or Amendment.

DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any fees associated with the filing of this correspondence to Deposit Account Number **50-0426**.

Respectfully submitted,
JENKINS, WILSON & TAYLOR, P.A.

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